



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,367	11/18/2005	Tsuyoshi Shiga	007324-0314107	8190
909	7590	05/03/2006	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			NGUYEN, TRAN N	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
			2834	

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/518,367	Applicant(s) SHIGA ET AL.	
	Examiner Tran N. Nguyen	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-19 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7 and 16-19 is/are rejected.
- 7) ☒ Claim(s) 4 and 8-15 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. **Claim 3** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3, “the inner circumferential face of each magnetic pole of the core has two opposite ends having respective distances between the opposite ends and the stator, said distances between each opposite end and the stator core is shorter than a distance between a circumferentially central portion of the inner circumferential face and the stator” is indefinite because the limitations seems to reverse the distance between the stator and the two ends of each rotor pole versus the distance between the stator and the central portion of the rotor pole.

According to the spec., page 8, lines 1-6, the convex (30) formed so that the radial dimensions thereof at both circumferential ends are smaller than the radial dimension at the center of the rotor pole, as shown in fig 2.

Therefore, the above recitation is understood as “*the inner circumferential face of each magnetic pole of the core has two circumferential opposite ends having respective distances between the opposite ends and the stator, said distances between each opposite end and the stator core is longer ~~shorter~~ than a distance between a circumferentially central portion of the inner circumferential face and the stator*”

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-2, 3** as understood, and **17-18** are rejected under 35 U.S.C. 102(b) as being fully anticipated by **Kushihira Takanobu et al (JP-2002-010602, hereafter Takanobu)**.

Takanobu discloses a rotor for a permanent magnet motor of an outer rotor type, the rotor having a plurality of permanent magnets and disposed around a stator, the rotor comprising: a frame (32); an annular iron core (33), combined integrally with the frame; and a plurality of insertion holes, formed in the core, so that the permanent magnets (37) are inserted in the insertion holes respectively, and wherein:

as recited in claim 2, the core, includes magnetic poles having respective inner circumferential faces, and the core is arranged so that a distance between the stator and the inner circumferential face of each magnetic pole is non-uniform with respect to a circumferential direction (figs 1, 5, 7, 9); and,

as claim 3 is understood, the rotor pole is formed as a convex shape so that the radial dimensions thereof at both circumferential ends are smaller than the a radial dimension at the center of the rotor pole; therefore, the inner circumferential face of each magnetic pole of the core has two circumferential opposite ends having respective distances between the opposite ends and the stator, said distances between each opposite end and the stator core is longer than a distance between a circumferentially central portion of the inner circumferential face and the stator; and

Art Unit: 2834

as recited in claims 17-18, the rotor core is formed by laminated steel sheets, and the magnets are inserted within the rotor core insertion holes.

4. **Claims 1, 5, and 16-18** are rejected under 35 U.S.C. 102(b) as being fully anticipated by **Sumiya Naoyuki et al (JP-2002-233122, hereafter Naoyuki)**.

5.

Naoyuki discloses a rotor for a permanent magnet motor of an outer rotor type (figs 1-8), the rotor having a plurality of permanent magnets (302, 303) and disposed around a stator, the rotor comprising: a frame (11); an annular iron core (301), combined integrally with the frame; and a plurality of insertion holes, formed in the core, so that the permanent magnets (302, 303) are inserted in the insertion holes respectively, and wherein:

as recited in claim 5, each insertion hole has a generally V-shaped (fig 5) or arc section (fig 6) with respect to a direction perpendicular to a radial direction and each insertion hole has two opposite ends located at an inner circumferential side of the core, and each permanent magnet has a generally V-shaped (magnet 302) or arc section (magnet 303) corresponding to a configuration of each insertion hole;

as recited in claims 16-18, the rotor core includes a plurality of unit cores, and the core is formed of laminated steel sheets, and the magnets are fitted in the insertion holes (figs 5-8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 5, 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Takanobu** in view of **Fukuda Eiji et al (JP-2000-166142, hereafter Eiji)**.

Takanobu discloses the claimed invention, except for the added limitations of the following:

(a) each insertion hole has a generally arc section with respect to a direction perpendicular to a radial direction and each insertion hole has two opposite ends located at an inner circumferential side of the core, and each permanent magnet has a generally arc section corresponding to a configuration of each insertion hole;

(b) the rotor core includes a plurality of unit cores

regarding the limitations of subsection (a) herein, Eiji, however, teaches these features (figs 3-4) for the purpose of providing reluctance torque to improved the motor torque while saving power consumption.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by configuring the rotor with each insertion hole has a generally V-shaped or arc section with respect to a direction perpendicular to a radial direction and each insertion hole has two opposite ends located at an inner circumferential side of the core, and each permanent magnet has a generally V-shaped or arc section corresponding to a configuration of each insertion hole, as taught by Eiji. Doing so would improve the motor torque while saving power consumption.

regarding the limitations of subsection (b) herein, magnetic core includes a plurality of unit core sections assembled into a unity core is well known in the art because such designed core would enable the accuracy configuration and facilitate the manufacturing process.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by configuring the rotor as plural core segments assembled into a unity core. Doing so would enable the accuracy configuration and facilitate the manufacturing process and divided core or segmented core are well known in the art.

7. **Claims 6-7 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Takanobu** in view of **Kim (US 5,929,547)**.

Takanobu discloses the claimed invention, except for the added limitations of the following: each insertion hole has generally V-shaped or arc section with respect a direction perpendicular to a radial direction and each insertion hole has two opposite ends located at an inner circumferential side of the core, and the core has a plurality of magnetic poles each of which composed of two permanent magnets provided in a circumferential one side of each insertion hole and the other side of each insertion hole respectively, and each permanent magnet is formed into a shape of a generally flat plate.

Kim, however, teaches a rotor with these features (figs 7-8) for the purpose of maintaining harmonious magnetic flux flow, preventing magnetic flux leakage and energy losses, by forming extended slots in a direction adapted to the direction of the magnetic flux flow.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by configuring the rotor with each insertion hole has generally V-shaped or arc section with respect a direction perpendicular to a radial direction and each insertion hole has two opposite ends located at an inner circumferential side of the core, and the core has a plurality of magnetic poles each of which composed of two permanent magnets provided in a circumferential one side of each insertion hole and the other side of each insertion hole respectively, and each permanent magnet is formed into a shape of a generally flat plate, as taught by Kim. Doing so would improve the rotor magnetic strength, maintain harmonious magnetic flux flow, preventing magnetic flux leakage and energy losses, by forming extended slots in a direction adapted to the direction of the magnetic flux flow.

Art Unit: 2834

Allowable Subject Matter

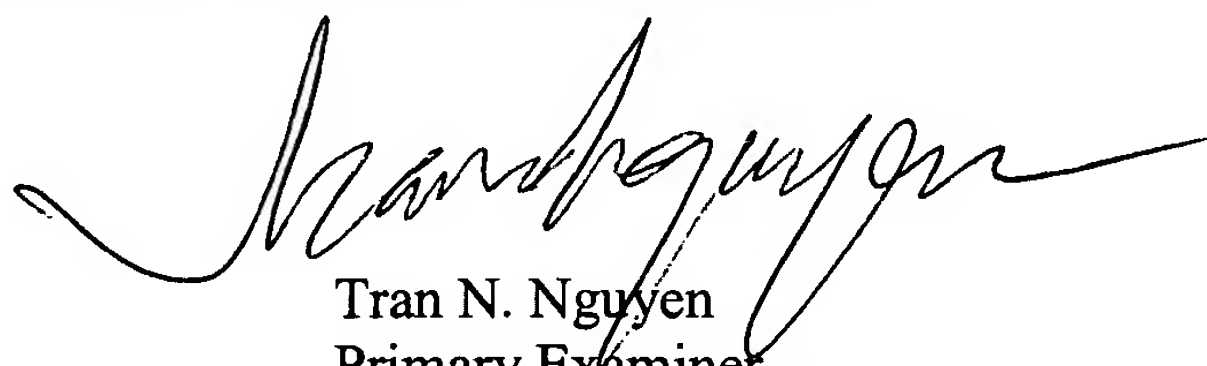
Claims 4 and 8-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tran N. Nguyen whose telephone number is (571) 272-2030. The examiner can normally be reached on M-F 7:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571)-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tran N. Nguyen
Primary Examiner
Art Unit 2834